SCIENCE & EDUCATION
Impact
Benefits from USDA/Land-Grant Partnership

Wet Ones

Protecting our nation's water quality.

Improvements in the nation's water quality over the past decade have been impressive. But the availability and quality of this precious resource still are threatened by soaring urban and rural demands. The need to conserve water, reduce pollution and deal with other environmental problems – including those associated with drought – is driving major research and education initiatives by Land-Grant Universities and the USDA. Innovative, cost-effective solutions are being developed to make sure the quality and quantity of water continue to meet high standards.

Payoff

- **Restoring the Everglades.** Restoring the Florida Everglades is among the nation's top environmental priorities. Sugarcane, vegetable, rice and sod farming in the 505,000-acre Everglades Agricultural Area generates more than $1 billion a year in economic activity. During the past 20 years, phosphorus in drainage water from this area has hurt water quality in Lake Okeechobee, Everglades National Park, Florida Bay and nearby areas. But an extensive best management practices (BMPs) program initiated by **Florida** reduced phosphorus levels in drainage water by more than 50 percent. Since 1997, second generation BMPs are reducing phosphorus levels in drainage water by another 10 percent to 25 percent.

- **Dairy diets.** To reduce harmful phosphorus levels in surface waters, **Wisconsin** researchers have altered the diets of dairy cows, cutting their phosphorus intake by one-third. As a result, the amount of phosphorus in manure was reduced by 50 percent. Better yet, runoff from fields fertilized with low-phosphorus manure contained just one-tenth as much phosphorus as runoff from fields fertilized with conventional manure. The new low-phosphorus diet allows producers to save $12 to $15 per cow per year. With 1.3 million cows in the state, that adds up to $16 million each year.

- **On a clear day.** In 1968, the water in Lake Tahoe was so clear that a white disk used to measure transparency could be seen at a depth of 104 feet. By 1997, after

RESEARCH, EXTENSION AND EDUCATION AT WORK

decades of rapid urbanization, the lake's legendary clarity reached a record low of 64 feet. With the help of the federal Tahoe Restoration Act, scientists in **California**, **Nevada** and the **USDA Forest Service** started a research and education program to restore the lake. They're helping manage urban development and transportation as well as wetlands, forests and other impacts on the lake. An environmental ethic has evolved among the people who live and work around the lake. Slowly but surely, Lake Tahoe water quality is improving. While clarity improved to 69 feet in 1999 and slipped to 67.3 feet in 2000, it's improved over the 1997 low of 64 feet.

- **Swine system.** Instead of relying on lagoons to remove contaminants from waste prior to land application, the nation's largest pork producing state is treating waste with a new "marsh-pond-marsh" system. Developed at **North Carolina A&T**, the system removes 90 percent to 95 percent of nitrogen from waste. It was developed in response to the state's moratorium on construction of swine waste lagoons. A series of wetland cells is the heart of the new waste disposal system, which relies on aquatic vegatation to absorb nitrogen, phosphorus and ammonium from wastewater. At the same time, water in the cells converts nitrogen to nitrogen gas, which is released harmlessly into the air. The system is ideal for farms with fewer than 500 hogs.

- **Ozone option.** While ozone helps protect Earth from harmful radiation and global warming, the gas also is being used by major cities to treat drinking water. Now, **Mississippi State** scientists have developed a cost-effective ozone treatment to remove contaminants from industrial wastewater. Research at a test facility indicates ozone could be used to treat wastewater from forest products industries across the South – at a cost of just 50 cents per l,000 gallons.

- **Pacific progress.** In the Pacific island region, **American Samoa** and **Hawaii** Extension are helping swine producers reduce animal waste and protect water quality in streams and mangrove areas of Samoa. A series of extension workshops, presented in English and Samoan, promoted better animal husbandry, proper waste management and disease control. The successful information campaign included publications, posters and fact sheets. The 180-plus producers attending 2001 workshops reported increased understanding and awareness of the impact of animal waste on water quality and human health.

- **Environmental excellence.** The Texas broiler industry produces about 400 million chickens each year, and up to 20 million birds die of disease or the effects of climate before they reach maturity. Carcass disposal in burial pits increases the risk of water pollution and spreading poultry diseases. To minimize these problems, **Texas A&M** developed a composting system that uses heat in enclosed, rotating tanks to decompose carcasses and kill bacteria. The composting system can be used to turn a variety of waste products – including dairy manure and meat processing plant waste – into safe organic fertilizer and conserve landfill space. The research earned environmental excellence awards from the state's governor and the U.S. Environmental Protection Agency.

- **It's the law.** In response to a 1999 state nutrient management act protecting watersheds and water quality, **Delaware** Extension initiated a successful statewide education program to certify agricultural producers and others affected by the law. The program includes environmental protection guidelines for enterprises that use plant nutrients or dispose of livestock wastes, including various types of agricultural operations, golf courses and lawn care firms. More than 3,000 people attended certification classes during the first year.

Cooperative State Research, Education, and Extension Service
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